

Genetic connectivity and cryptic biodiversity in Florida and Caribbean reef invertebrates

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EFFECTIVE SPATIAL MANAGEMENT OF REEFS AND MPA DESIGN

Requires:

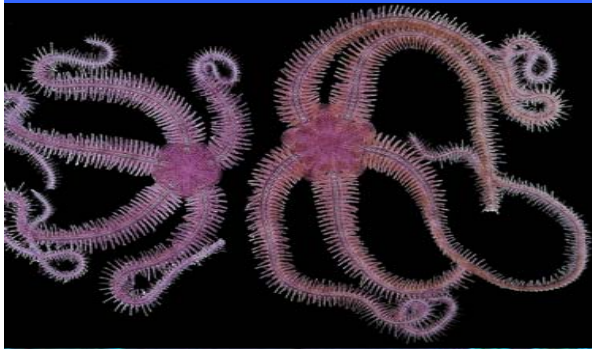
- Reliable estimates of dispersal and connectivity among reefs
- Assessment of biodiversity (genetic)

NCRI GENETICS RESEARCH QUESTIONS

1. How connected are Florida reefs?
2. How connected are Caribbean reefs to each other and to Florida reefs?
(NCRI Monitoring Network)



Ophiothrix lineata



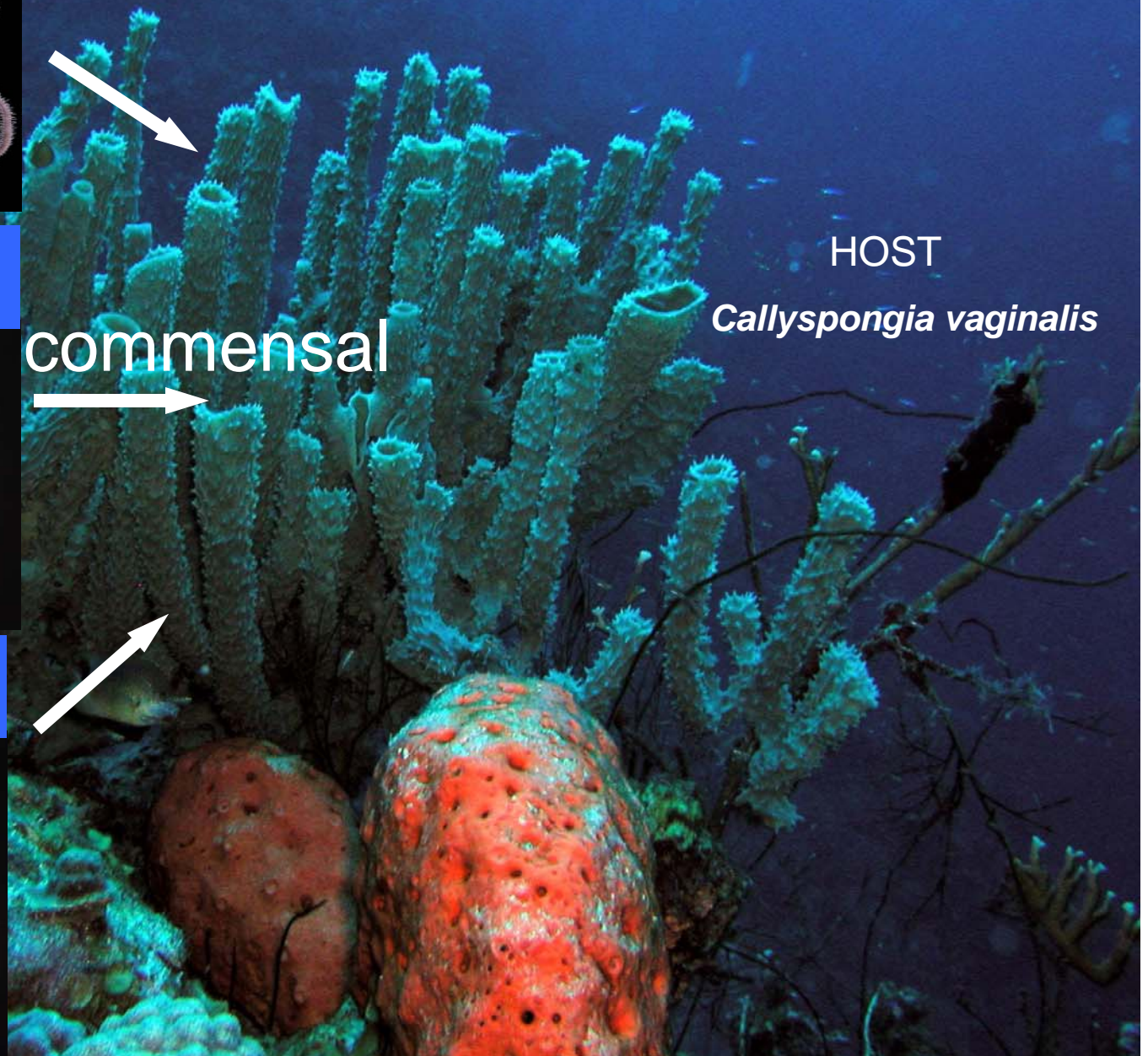
Leucothoe spinicarpa
(morphospecies 3)



Leucothoe spinicarpa
(morphospecies 4)



SPECIES BEING STUDIED

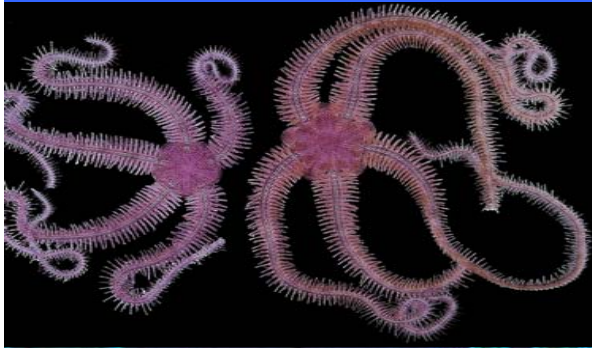


HOST

Callyspongia vaginalis

commensal

Ophiothrix lineata



Leucothoe spinicarpa
(morphospecies 3)



Leucothoe spinicarpa
(morphospecies 4)



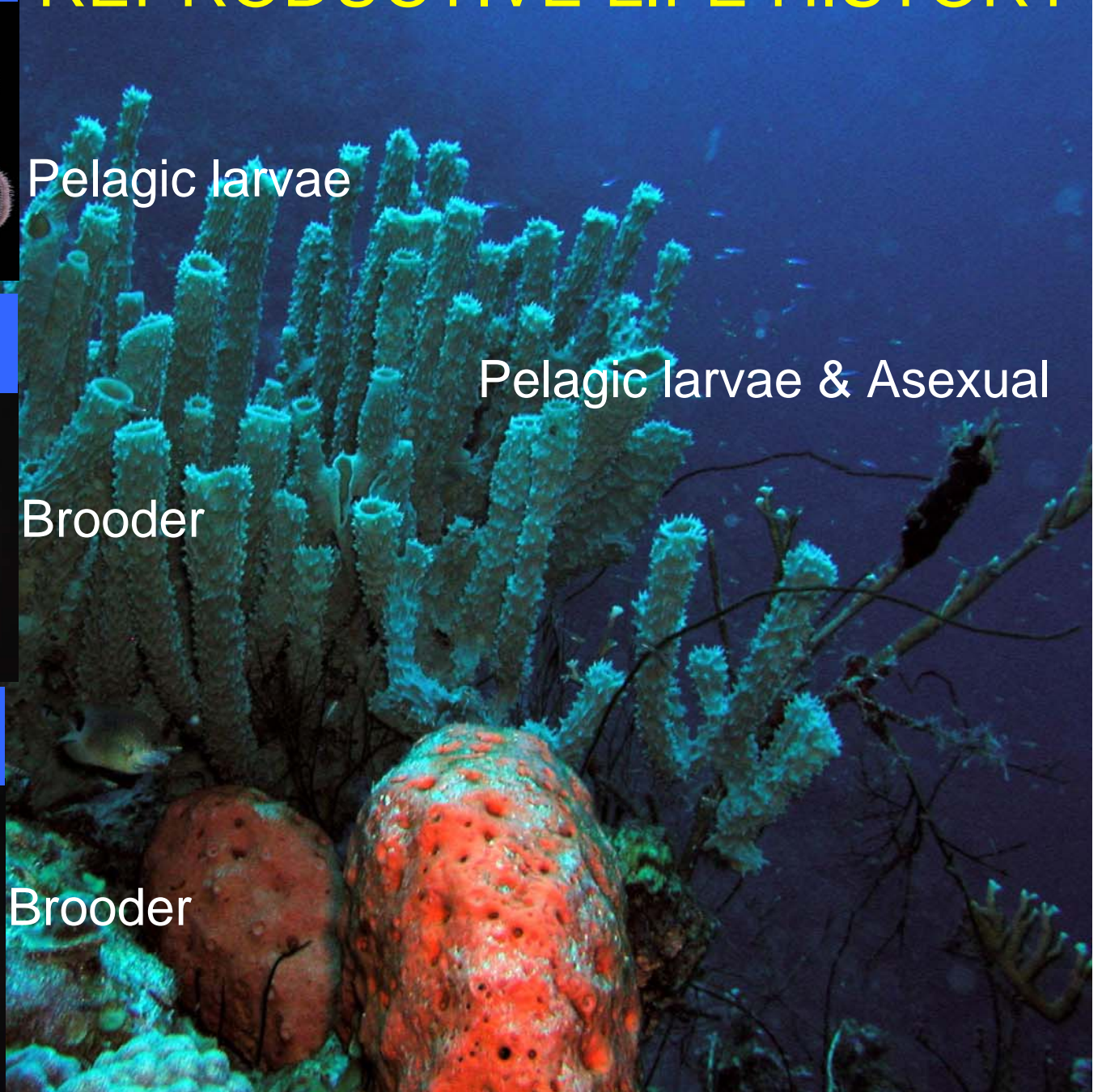
REPRODUCTIVE LIFE HISTORY

Pelagic larvae

Pelagic larvae & Asexual

Brooder

Brooder



ADVANTAGES OF APPROACH

- Multi-species view of connectivity
- Diverse reproductive life histories
 - brooders – predict low dispersal & connectivity
 - pelagic larvae – predict high dispersal & connectivity
- Common micro-habitat (host sponge) for all species
 - i.e. all species are subject to the same small scale hydrodynamic environment

DNA sequenced from mt COI gene



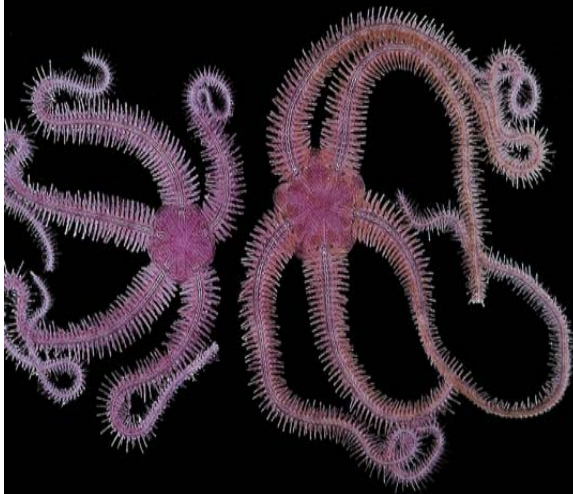
***Leucothoe spinicarpa* (morphotype 4)**

422 bp of COI



***Leucothoe spinicarpa* (morphotype 3)**

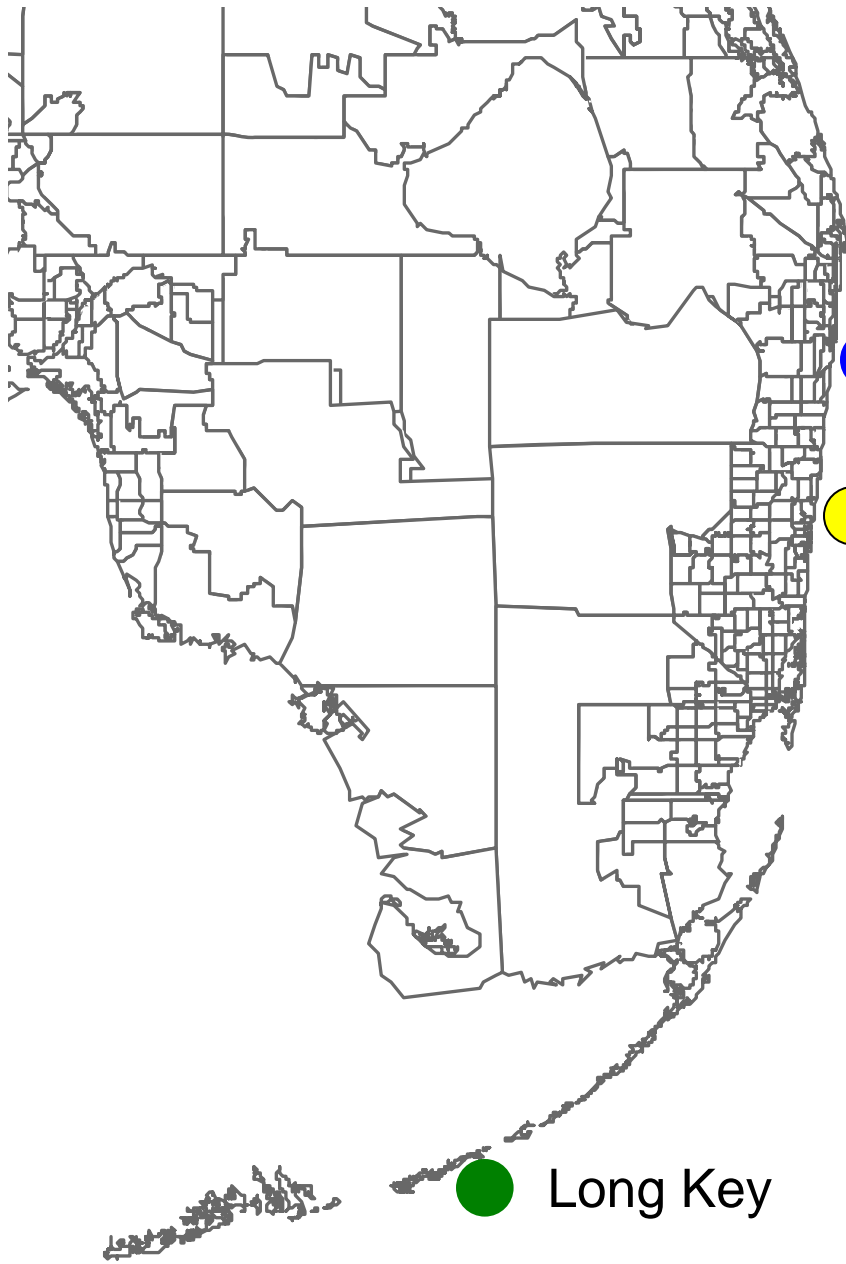
415 bp of COI



Ophiothrix lineata

735 bp of COI

Florida Reef Sampling Sites



● West Palm Beach

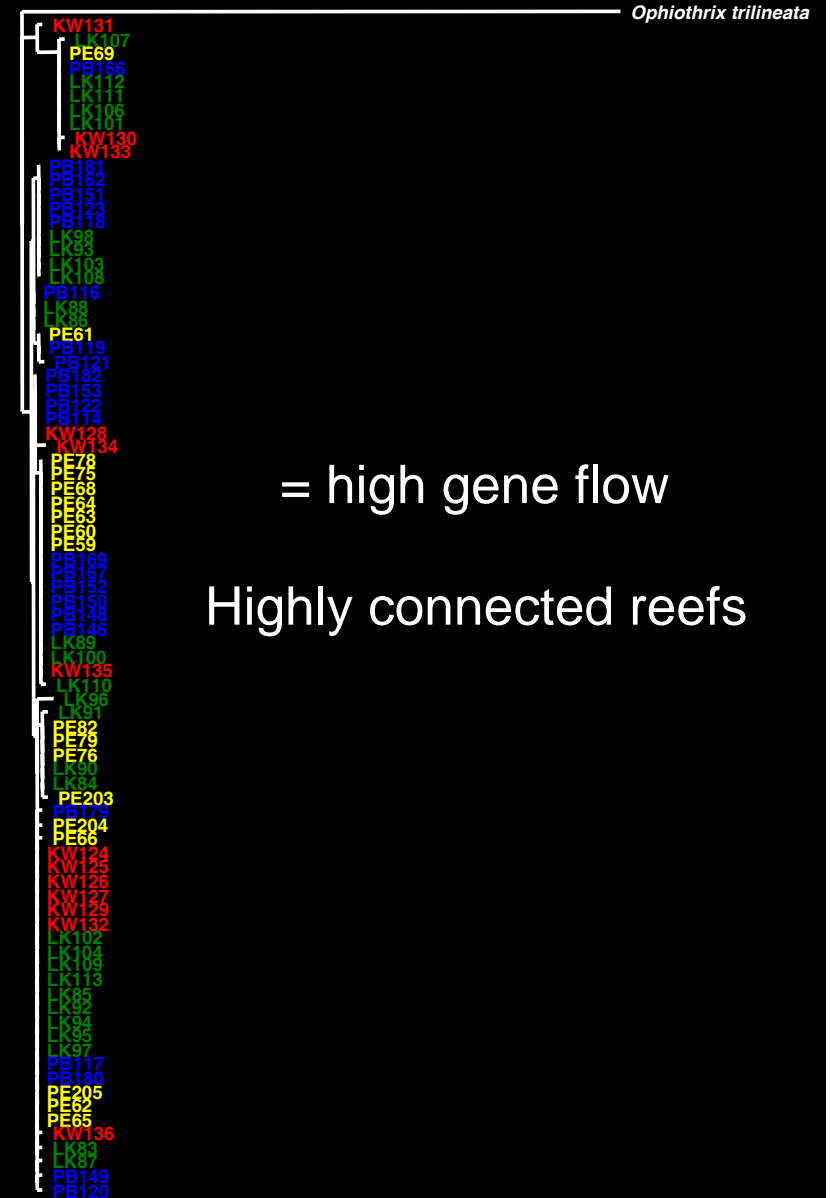
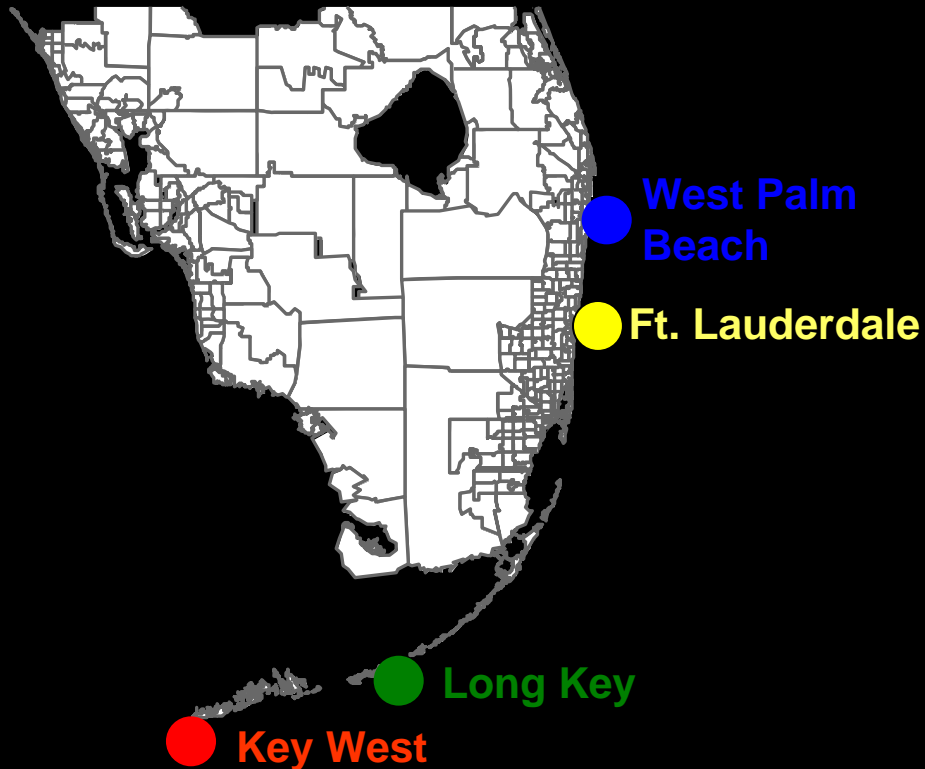
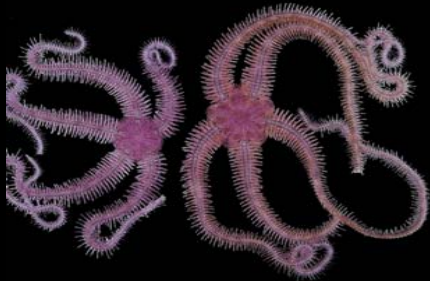
● Ft. Lauderdale

● Long Key

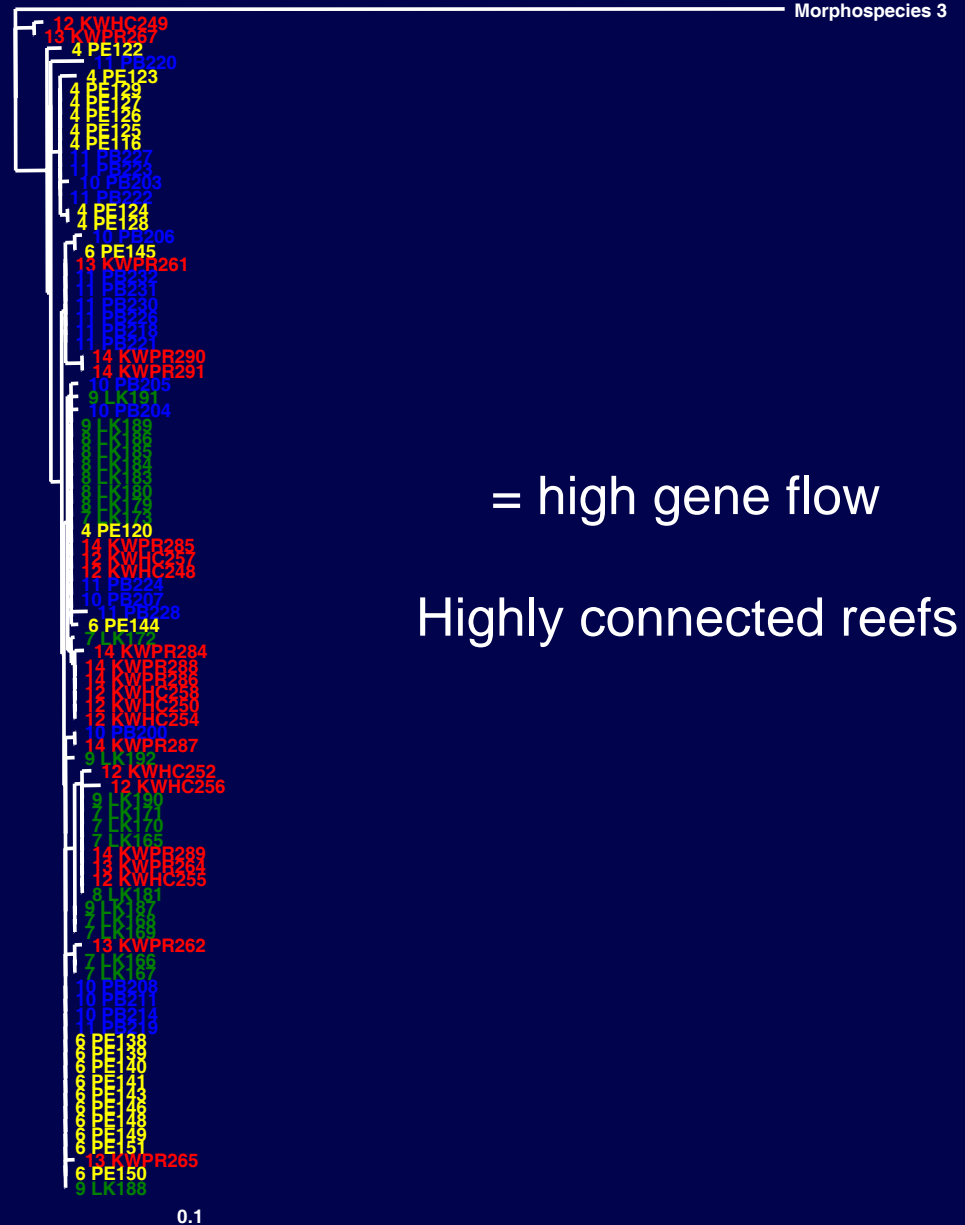
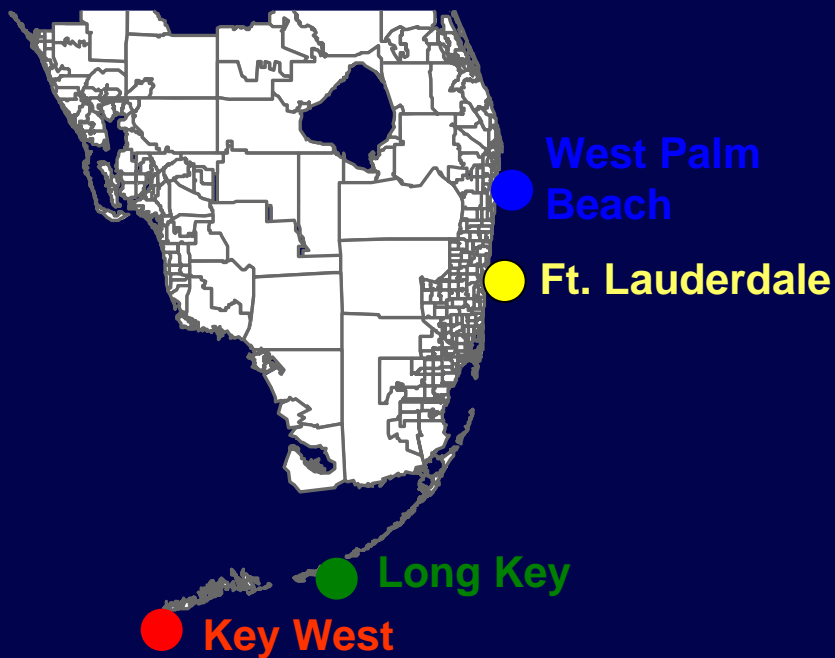
● Key West



Relationships Among *Ophiothrix lineata* sequences



Relationships Among Amphipod Morphospecies 4 sequences

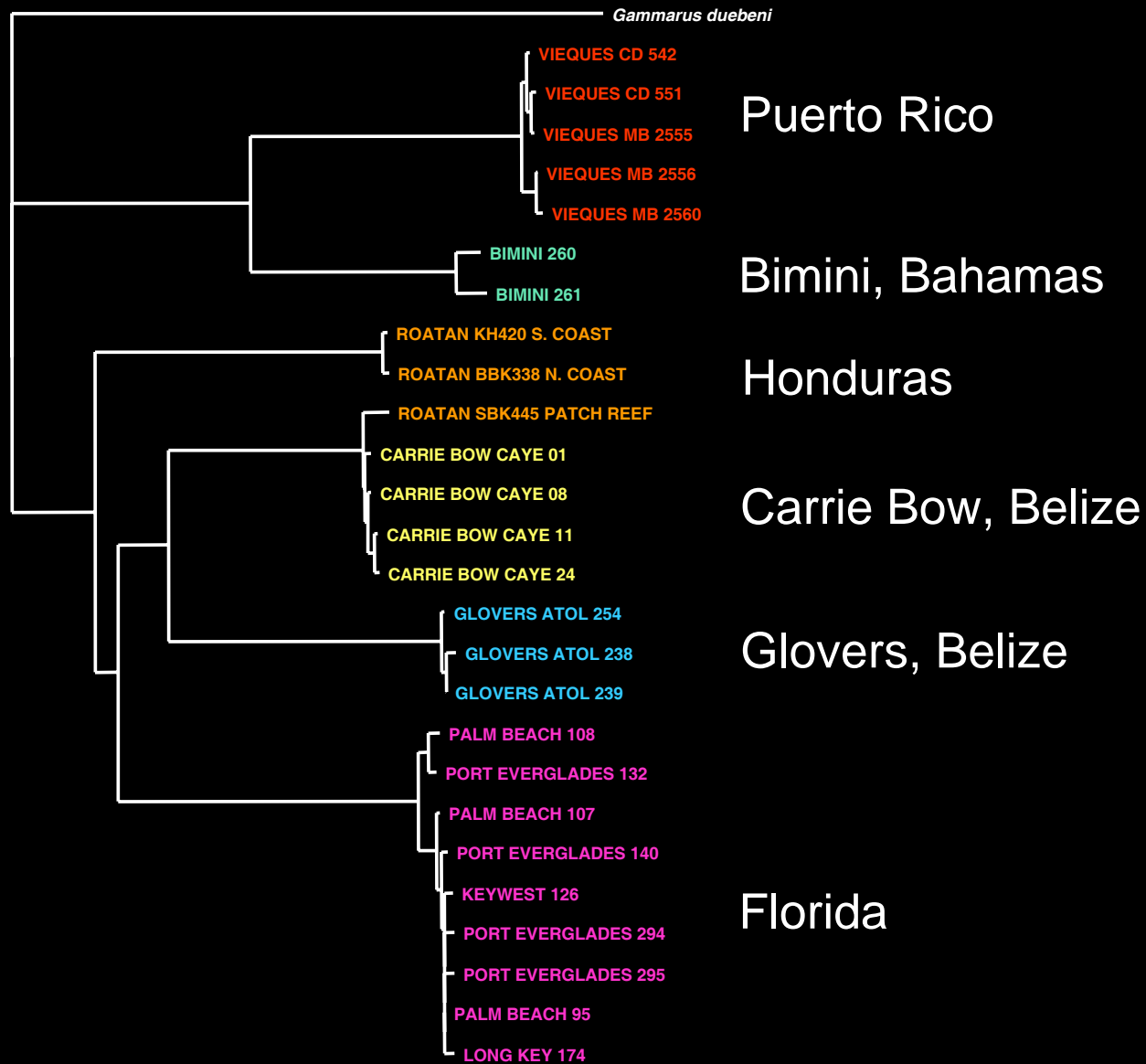


Caribbean Sampling Sites

NCRI Monitoring Network



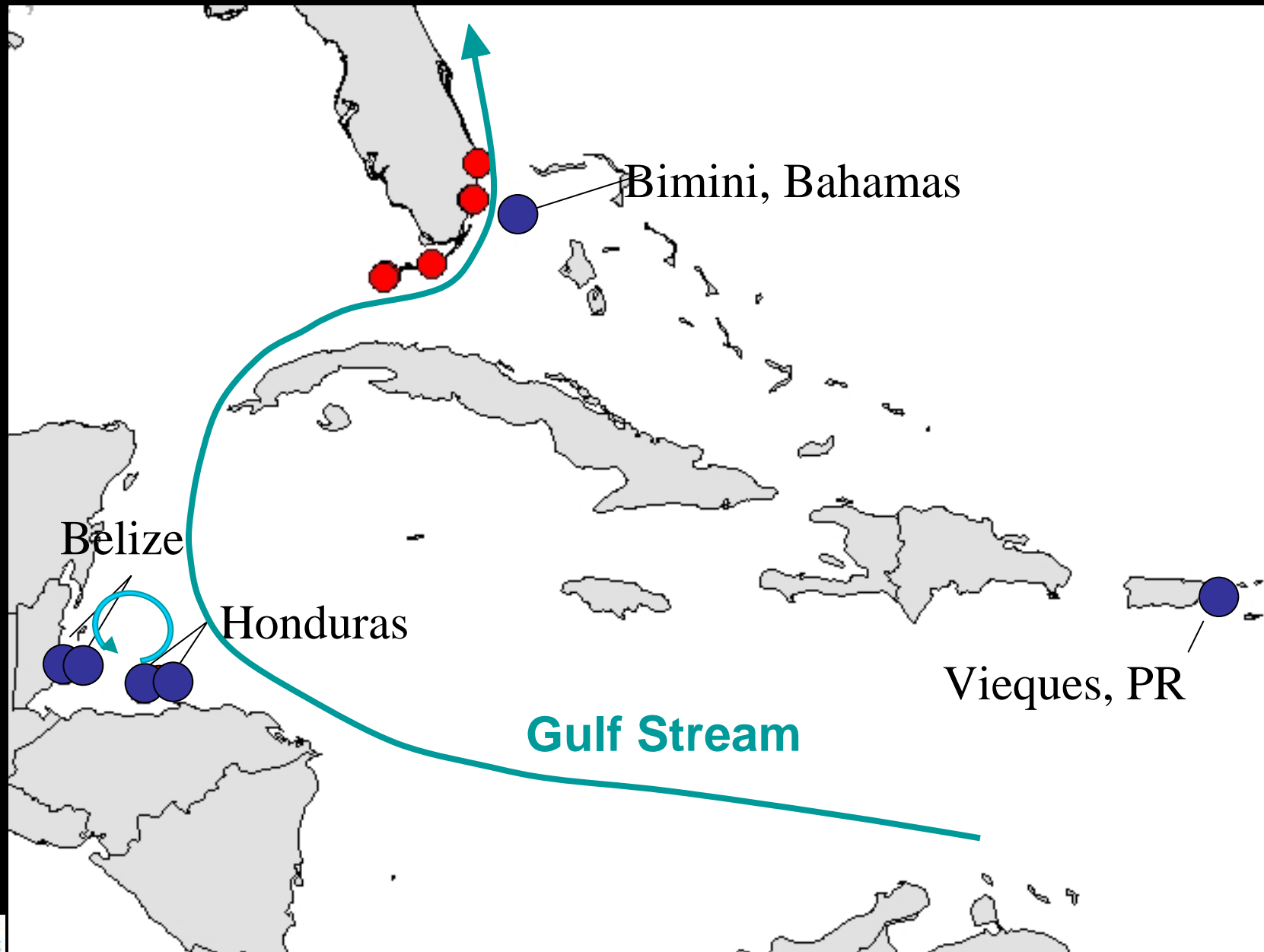
Caribbean wide Relationships Among Amphipod Morphospecies 3



Caribbean Reefs not connected

0.1

Caribbean Sampling Sites NCRI Monitoring Network



TAKE AWAY MESSAGE

- Florida reefs appear highly connected.
- Caribbean-wide reefs mostly unconnected to each other and to Florida reefs.
(tentative – based on examination of one brooding species)
- Genetic analysis indicates potentially high levels of undetected cryptic biodiversity in Caribbean reefs.

A vibrant underwater photograph of a coral reef. The scene is dominated by various types of coral, including tall, columnar corals and a large, rounded, orange-colored coral in the foreground. Small fish are visible swimming around the coral. The background is a deep blue, suggesting the open ocean.

Acknowledgments

Funding:

NOAA Coastal Ocean Program
National Coral Reef Institute
Guy Harvey Research Institute